

LISTING OF THE CLAIMS

This listing of claims will replace all prior versions, and listings, of claims in the application:

- 63. (Previously Presented)** A method of imaging a sample, the method comprising:
- a) irradiating the sample to be imaged with pulsed electro-magnetic radiation with a plurality of frequencies in the range of 50 GHz to 84 THz;
 - b) subdividing an area of the sample which is to be imaged into a two dimensional array of pixels, and detecting radiation from each pixel over a plurality of frequencies; and
 - c) generating an image of the area of the sample from the radiation detected in step (b) using a frequency or a selection of frequencies from the plurality of frequencies in the pulsed electro-magnetic radiation.
- 64. (Previously Presented)** The method of Claim 63, wherein the sample to be imaged is irradiated with pulsed electro-magnetic radiation with a plurality of frequencies in the range from 100 GHz to 20 THz.
- 65. (Previously Presented)** The process of Claim 64, wherein the sample to be imaged is irradiated with pulsed electro-magnetic radiation with a plurality of frequencies in the range from 500 GHz to 10 THz.
- 66. (Previously Presented)** The method of Claim 63, wherein a single image is generated using a selected frequency range.
- 67. (Previously Presented)** The method of Claim 66, wherein the selected frequency range is less than a third of the frequency range of the pulsed electro-magnetic radiation which irradiates the sample.

68. (Previously Presented) The method of Claim 63, wherein a plurality of images is generated from a corresponding plurality of different frequencies.

69. (Previously Presented) The method of Claim 63, wherein, in step (b), the radiation is detected in the time domain and is Fourier transformed to obtain frequency dependent data.

70. (Previously Presented) The method of Claim 63, wherein a fraction of the input pulsed radiation does not irradiate the area of the sample, which is to be imaged, and is detected as a reference signal.

71. (Previously Presented) The method of Claim 63, wherein the method further comprises the step of detecting a reference signal when the area of the sample to be imaged is absent from the path of the pulsed electro-magnetic radiation.

72. (Previously Presented) The method of Claim 70, wherein step (c) comprises the steps of deriving frequency dependent image data from the detected radiation and plotting the frequency dependent image data for each pixel to obtain an image of the sample.

73. (Previously Presented) The method of Claim 70, wherein step (c) comprises the steps of calculating the Power Spectrum for the radiation detected in step (b) and calculating the Power Spectrum of the reference signal.

74. (Previously Presented) The method of Claim 73, wherein the frequency dependent image data is calculated by subtracting the Power Spectrum of the reference signal from the Power Spectrum of the radiation detected in step (b).

75. (Previously Presented) The method of Claim 72, wherein the frequency dependent image data is calculated by dividing the Power Spectrum of the radiation detected in step (b) by the Power Spectrum of the reference signal.

76. (Previously Presented) The method of Claim 72, wherein the frequency dependent image data is calculated by deriving the frequency dependent absorption coefficient from a Fourier transform of the radiation detected in step (b) and a Fourier transform of the reference signal.

77. (Previously Presented) The method of Claim 72, wherein the frequency dependent image data is calculated by deriving the frequency dependent refractive index from a Fourier transform of the radiation detected in step (b) and a Fourier transform of the reference signal.

78. (Previously Presented) The method of Claim 72, wherein the frequency dependent image data is derived for two or more frequencies.

79. (Previously Presented) The method of Claim 78, wherein the frequency dependent image data for the two frequencies is added, subtracted, multiplied and divided for each pixel.

80. (Previously Presented) The method of Claim 72, wherein the frequency dependent image data is obtained for a narrow range of frequencies and the image data is integrated over this narrow range.

81. (Previously Presented) The method of Claim 72, wherein the frequency dependent image data is processed by subdividing the data into a plurality of bands, wherein each band represent a range of magnitudes of the image data for a single frequency or narrow frequency range and each band is assigned a single value or color.

82. (Previously Presented) The method of Claim 81, wherein the bands are not of equal widths in magnitude.

83. (Previously Presented) The method of Claim 81, wherein the image data is derived for more than one frequency and image data for two or more frequencies is combined according to a predetermined rule.

84. (Previously Presented) The method of Claim 83, wherein there are two bands assigned the values '0' and '1' and the predetermined rule is a BOOLEAN algebraic rule.

85. (Previously Presented) The method of Claim 63, the method further comprising the step of displaying a sequence of images generated in step (c) for a plurality of different frequencies.

86. (Previously Presented) The method of Claim 85, wherein the image generated in step (c) is scanable through a continuum of frequencies.

87. (Previously Presented) The method of Claim 85, wherein the image generated in step (c) can be stepped through a plurality of discrete frequencies.

88. - 116. (Canceled)